Exogenous Factors: Oft Missed Opportunities for Preventing Surgical Site Infections Part 2

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Disclosures
Today’s speaker, Wava Truscott, discloses no actual or potential conflict of interest in relation to this program/presentation.

The following planning staff report no actual or potential conflict of interest in relation to this program/presentation.

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- Bill Bridges PhD

Exogenous Factors: Oft Missed Opportunities for Preventing Surgical Site Infections (SSI): Part 2

Objectives
1. Describe the expanding threat of progressive pathogens
2. List non-patient sources of surgical site contamination
3. Summarize circumstances in the OR that can reduce the patient’s ability to fight infection
Part 1 Summary

- Over 40 new pathogens in last 25 yr
- Microorganisms mutating – “Prime Directive: To survive” by new:
  - hosts (animal to man)
  - aggressiveness
  - enhanced toxins
  - bodily routes to enter & locations to infect
  - antibiotic & drug resistance
- Pharmaceutical companies developed:
  - 1983-1987 = 16 new antibiotics
  - 2008-2012 = 2 new antibiotics
- CDC: Moving toward “Post-Antibiotic Era”:
  - must prevent infections before they occur
  - SCIP initiatives not enough
  - disinfection critical: on surfaces & fabrics

Taking Pathogens Into OR

- Hair: source of Staphylococcus
  - 90% hair growing phase; 10% resting phase
  - lose 50-100 resting strands/day for new growth
  - more Staphylococcus the longer and dirtier the hair
- One hair follicle can hold 50,000 “germs”
- Hair source Staph infections:
  - 11 general surgery SSI
  - 5 Renal transplant SSI
- Wearing head cover increases air-borne transmission of bacteria in Surgical area
  - no cover = 3-5 fold more air contamination
  - bacterial sedimentation rate in the wound area increased approximately 60-fold

References in last slide of deck “Hair and Head Cover”
Head Covers
  + Dandruff increases bacterial shedding
    - treat, cover
  + 20 group A Streptococcus (GAS) SSIs over 3yr
    - settling plates during surgery = same Strep A
    - all 109 surgical staff repeatedly swabbed negative
    - anesthesia cart inventory specialist not in surgeries: not tested
    - psoriasis behind ear colonized with Strep. A
  + If personal head covers worn should be fresh daily, low linting, covered with disposable cover (facility call)
  + Place head covers so 1st donned: prevents “fall-out” to other PPE

References in last slide of deck “Hair and Head Cover”

How Long Alive After Contamination?
  + Neely: Shriner’s Children’s Hospital Cincinnati OH
    - pure cotton clothing/scrubs
    - cotton terry cloth towels
    - cotton-polyester for lab coats
    - polyester used for privacy curtains
    - polyethylene splash aprons
  + MRSA survived
    - 7 wks on polyester and cotton
    - 12 wks on polyethylene
  + VRE 4 months
Bacteria are stopped by mask; but they are alive and can transfer.

No Excuse for Bad Habits
Airborne Contamination

- Utilize appropriate ventilation
- Reduce OR traffic
- Keep OR doors closed
- Tuck in shirts - men shed heavily
- Delay final opening instruments til just before needed

(Opened: Contaminated trays: 30min=15%; 1hr=22%; 4hr=30% Dalstrom 2008)

Staphylococcus, streptococcus, fungus (primarily threat to immunocompromised) often found in contaminated air

Anesthesia Providers

- 1998-2008: 33 US HC outbreaks reported HBV &/or HCV, >60,000 patients at risk; as of 2009, 448+
  - assumed a gross underestimate
  - primarily due to
    - lapses in aseptic technique
    - contamination parenterals during prep. & admin.
    - reuse of needles & syringes
    - use of single use vials on numerous patients – midazolam, fentanyl, and especially propofol
5 Second Rule Does Not Apply!!

Munoz-Price (Unseen observer study)

+ Anesthesia providers retrieve objects dropped on floor
  - did not disinfect items, used on or near patient
  - did not perform hand hygiene

+ Line insertions, bronchoscopies: blood/mucous
  - not followed by hand hygiene

+ Stopcocks accessed 66 times
  - only disinfected on 15% ports

+ Tape stuck to many object, potentially exposed hours

Munoz-Price 2013

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6 Hand Hygiene Tips for Anesthetists

1. **Make disinfection easier.** To make it as easy as possible to thoroughly wipe down anesthesia machines between patients, mount disinfectant wipes on each machine so that your anesthesia providers can clean surface areas, knobs and dials. [WT add: Also mount foaming hand sanitizer]

2. **Plan ahead.** Try to have all supplies you might use out and on the anesthesia machine before the case starts, and treat the anesthesia machine as a contaminated area. If you have to go back to the cart during the case, make sure you remove your gloves and foam your hands.

3. **Diligently wear gloves.** A lot of breaches occur in this area. Providers are well aware that they need to wear them, but the gloves often come off for one reason or another. To the greatest extent possible — and it isn’t always possible — switch to clean gloves every time you deal with a new domain.

4. **Beware of the glove box.** Most facilities have glove boxes with disposable gloves available to the anesthesia provider. But unless care is taken, every time you reach in to get a fresh pair, you may contaminate both the gloves you’re about to put on and the other gloves in the box.

5. **Double-glove during airway management.** Once the airway is secure, take the outer pair off.

6. **Educate.** We regularly go through all kinds of educational modules to maintain privileges — modules having to do with harassment, fire safety, and trips and falls — but I’ve never seen one on the risks of diseases or transmission of pathogens in the workplace. It’s been shown that a sophisticated campaign aimed at maintaining hand hygiene among anesthesia providers can lead to a reduction of surgical site infections, and maybe even a reduction in mortality.

Outpatient Surgery December 2015  — Clarence J. Bieda, CRNA, PhD
Free Helpful ASA Guideline

86 page pdf anesthesiologist guideline for infection prevention:

“Recommendations for Infection Control for the Practice of Anesthesiology (Third Edition)”

Medical Adhesive Tape

Medical tape scrutiny:
- partially used tape in patient rooms often contaminated with pathogens
- handling tape with contaminated hands/gloves contaminates tape
- sticking tape onto contaminated surface while preparing to use
- bacteria from patient’s skin & pores contaminate adhesive side of tape

Enterobacteriaceae (family) including:
- Enterobacter, E. coli, Klebsiella
- Micrococcus
- Pseudomonas
- Staphylococcus aureus (MSSA, & MRSA)
- Staphylococcus coagulase-negative
- Alpha hemolytic streptococcus (GAS)
- Vancomycin-resistant Enterococcus (VRE)
- Rhizopus, Mucormycotina fungi (>170 cases)

Current Study
1 & 2: In-use tape swabs
3 & 4: In-use tape removed from patient/placed over IV needle.

Redelmeier: 30 of 40 tape rolls + pathogens; no + in 12 unopened tape boxes
Harris: 3 hospitals: tape often + for MDROs
Berkowtz: 23 rolls + pathogens in 16 bed ICU

Note growth under tape
Pathogens on Surgical Tourniquets

- Ready for use in surgery “disinfected” tourniquets
  - 100% Staphylococcus: coagulase-negative
  - 20% Staphylococcus aureus
  - 20% Aerococcus viridans or Corynebacterium 60%
  - 60% Bacillus spp.

Bacterial Contamination of Surgery Table Mattresses

- 458 FDA reports contaminated OR mattresses 2011-2013
- Worn, cracked, & pin holes let blood & body fluids leak in, microbial growth
- Mattress covers: can appeared intact though compromised
- Zippers: may allow blood/body fluids through

(FDA: Alert, Jan 31, 2015; Alert, Apr 2013)
What About the OR Itself? Must Be Pretty Sterile!?

Tested After Cleaning & Disinfection

<table>
<thead>
<tr>
<th>OPERATING ROOM CONTAMINATION</th>
<th>% with Skin bacteria</th>
<th>% with Pathogens</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anesthesia equipment a</td>
<td>47.2</td>
<td>11.3</td>
</tr>
<tr>
<td>Bed b</td>
<td>54.7</td>
<td>11.9</td>
</tr>
<tr>
<td>Mayo Stands</td>
<td>37.1</td>
<td>8.5</td>
</tr>
<tr>
<td>IV Pumps and poles</td>
<td>56.5</td>
<td>17.4</td>
</tr>
<tr>
<td>Circulating nurse area</td>
<td>74.6</td>
<td>17.5</td>
</tr>
<tr>
<td>OR entry door</td>
<td>95.5</td>
<td>0</td>
</tr>
<tr>
<td>All objects (excluding floors)</td>
<td>59.3</td>
<td>12.6</td>
</tr>
<tr>
<td>Floor</td>
<td>36.4</td>
<td>63.6</td>
</tr>
<tr>
<td>All objects (including floors)</td>
<td>57.6</td>
<td>16.6</td>
</tr>
</tbody>
</table>

(Munoz-Price, 2012)

Contaminated OR floor
- Patient fastening strap
- IV tubing

Gram-negative bacilli
- Acinetobacter spp.
- More gram-neg bacilli

Gram-Positive cocci
- Enterococcus spp.
- Staphylococcus aureus
Most Frequent Causes of Surgical Infections

<table>
<thead>
<tr>
<th>Bacteria</th>
<th>Percent SSI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staphylococcus aureus</td>
<td>30.0%</td>
</tr>
<tr>
<td>Staphylococcus Coagulase-negative (skin)</td>
<td>13.7%</td>
</tr>
<tr>
<td>Enterococcus spp.</td>
<td>9.6%</td>
</tr>
<tr>
<td>Pseudomonas aeruginosa</td>
<td>5.6%</td>
</tr>
<tr>
<td>Enterobacter spp.</td>
<td>4.2%</td>
</tr>
<tr>
<td>Klebsiella pneumoniae</td>
<td>3.0%</td>
</tr>
<tr>
<td>Candida spp.</td>
<td>2.0%</td>
</tr>
<tr>
<td>Klebsiella oxytoca</td>
<td>0.7%</td>
</tr>
<tr>
<td>Acinetobacter baumannii</td>
<td>0.6%</td>
</tr>
</tbody>
</table>

43.7% Staph SSI

Survival on Dry Inanimate Surfaces

<table>
<thead>
<tr>
<th>Pathogen: Bacteria</th>
<th>Survival on Dry Inanimate Surfaces</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acinetobacter</td>
<td>3dy to 5mon</td>
</tr>
<tr>
<td>Campylobacter jejuni</td>
<td>Up to 6dy</td>
</tr>
<tr>
<td>Clostridium difficile (spores)</td>
<td>5mon</td>
</tr>
<tr>
<td>Escherichia coli</td>
<td>1.5hr to 16mon</td>
</tr>
<tr>
<td>Enterococcus spp. Including VRE &amp; VSE</td>
<td>5dy to 4mon.</td>
</tr>
<tr>
<td>Haemophilus influenza</td>
<td>12dys</td>
</tr>
<tr>
<td>Klebsiella spp.</td>
<td>2hr to greater than 30mon</td>
</tr>
<tr>
<td>Mycobacterium tuberculosis</td>
<td>1dy to 4mon</td>
</tr>
<tr>
<td>Proteus vulgaris</td>
<td>1-2dy</td>
</tr>
<tr>
<td>Pseudomonas aeruginosa</td>
<td>6hr to 16mon; 5wk dry floors</td>
</tr>
<tr>
<td>Staphylococcus aureus (includes MRSA)</td>
<td>7dy to 7mon</td>
</tr>
<tr>
<td>Streptococcus pneumoniae</td>
<td>1 to 20dy</td>
</tr>
<tr>
<td>Streptococcus pyogenes</td>
<td>3dy to 6.5mon</td>
</tr>
</tbody>
</table>

(Kramer A. (A Review) BMC Infect Dis 2006;8:1351(2) Borrila H F. JCHE 1996;17: 770-71)
# Survival on Dry Inanimate Surfaces

<table>
<thead>
<tr>
<th>Pathogen: Fungi/Yeast</th>
<th>Survival on Dry Inanimate Surfaces</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Aspergillus conidia</em> (spores)</td>
<td>Months or longer</td>
</tr>
<tr>
<td><em>Candida albicans</em></td>
<td>1-120dy</td>
</tr>
</tbody>
</table>

## Pathogen: Viruses

<table>
<thead>
<tr>
<th>Virus</th>
<th>Survival</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adenovirus</td>
<td>7dy to 3mon</td>
</tr>
<tr>
<td>Coronavirus (SARS, GI infections, cold)</td>
<td>3-26dy</td>
</tr>
<tr>
<td>Coxsackie virus</td>
<td>More than 2wk</td>
</tr>
<tr>
<td>Cytomegalovirus</td>
<td>8hr</td>
</tr>
<tr>
<td>HBV</td>
<td>2hr to 60dy</td>
</tr>
<tr>
<td>HIV</td>
<td>More than 7dy</td>
</tr>
<tr>
<td>Influenza virus</td>
<td>1-2dy</td>
</tr>
<tr>
<td>Norovirus</td>
<td>CDC: Stable in environment</td>
</tr>
<tr>
<td>Papillomavirus 16</td>
<td>More than 7dy</td>
</tr>
<tr>
<td>Respiratory syncytial virus (RSV)</td>
<td>Up to 6hr</td>
</tr>
<tr>
<td>Rotavirus</td>
<td>2dy to 2mon</td>
</tr>
</tbody>
</table>

(Base-Smith: OR Contamination)

## Base-Smith: OR Contamination

<table>
<thead>
<tr>
<th>Location</th>
<th>Organic or Inorganic Soiling</th>
<th>Microbial Contamination</th>
</tr>
</thead>
<tbody>
<tr>
<td>OR</td>
<td>90%</td>
<td>100%</td>
</tr>
<tr>
<td>BSICU</td>
<td>80%</td>
<td>100%</td>
</tr>
<tr>
<td>MICU</td>
<td>60%</td>
<td>90%</td>
</tr>
<tr>
<td>PACU</td>
<td>50%</td>
<td>100%</td>
</tr>
<tr>
<td>SICU</td>
<td>20%</td>
<td>100%</td>
</tr>
<tr>
<td>ER</td>
<td>20%</td>
<td>80%</td>
</tr>
</tbody>
</table>

(Base-Smith V, JAANA 1996;64:141-5)
Why Are We Not Removing More Pathogens From Surfaces?

- Is it education: pathogens & consequences?
- Is it cleaning quality: remove all organics?
- Is it disinfection knowledge?
- Is it technique?

It’s Some of Each

Monitoring Cleaning Effort
Getting Rid of Organic Soiling

Scrubbed it?
Fluorescent light/black light
(DAZO solution)

DAZO on:
Cannot see with normal light

Scored it
Fluorescent light/black light

Visual for monitoring cleaning effectiveness
improved performance significantly
OR Cleaning Effectiveness

**Baseline**
- 194 ORs with 2,820 objects evaluated
- 47% properly cleaned (scored by UV markers)
- Anesthesia machine knobs, computers, medication carts, IV poles, OR beds, & floors most often poorly cleaned

**Education / Intervention**
- Graphic electronic feedback daily to Staff, Exec. Mgt, Quality, Patient safety, Risk mgt.
- 4 months rose to 82% successful cleaning
- Gram (-) rod bacteria dropped from 10.7% to 2.3%

(Munoz-Price, 2012)

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**Disinfectants**
Type, Quality of Preparation & Techniques
All Make a Difference
## Killing: Levels of Difficulty

<table>
<thead>
<tr>
<th>Extremely Hard to Kill</th>
<th>Harder to Kill</th>
<th>Hardest to Kill</th>
<th>Medium</th>
<th>Easy to Kill</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Prions</strong></td>
<td>Spores of: C. difficile; C. tetanus; C. botulinum; C. perfringens; Anthrax</td>
<td><strong>Transmissible Spongiform Encephalopathy (TSE); Creutzfeldt-Jakob disease(CJD)</strong>; Mad cow disease; Scrapies</td>
<td><strong>M. Tuberculosis (TB); M. avium; M. leprae</strong></td>
<td><strong>Bacterial Spores</strong></td>
</tr>
<tr>
<td><strong>Mycobacteria</strong></td>
<td><strong>Viruses with lipid envelopes</strong></td>
<td><strong>Fungi includes fungal spores</strong></td>
<td><strong>Bacterial spores</strong></td>
<td><strong>Mycobacterium (tuberculocidal)</strong></td>
</tr>
<tr>
<td><strong>Gram negative bacteria</strong></td>
<td><strong>Gram positive bacteria</strong></td>
<td><strong>Enveloped (lipid)</strong></td>
<td><strong>Bacterial spores</strong></td>
<td><strong>Mycobacterium (tuberculocidal)</strong></td>
</tr>
</tbody>
</table>

### Environmental Surface Disinfection

<table>
<thead>
<tr>
<th>Extremely hard to Kill</th>
<th>Harder to Kill</th>
<th>Medium</th>
<th>Easy to Kill</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bacterial spores</strong></td>
<td><strong>Mycobacterium (tuberculocidal)</strong></td>
<td><strong>Viruses without envelopes</strong></td>
<td><strong>Fungi &amp; fungal spores</strong></td>
</tr>
<tr>
<td><strong>Gram negative bacteria</strong></td>
<td><strong>Gram positive bacteria</strong></td>
<td><strong>Enveloped (lipid) viruses</strong></td>
<td><strong>Soaps &amp; Detergents</strong></td>
</tr>
<tr>
<td><strong>Soaps &amp; Detergents</strong></td>
<td><strong>Phenols</strong></td>
<td><strong>Quat/Alcohol blends</strong></td>
<td><strong>Aldehydes Glutaraldehyde Formaldehyde Ortho-phthaldehyde</strong></td>
</tr>
<tr>
<td><strong>Quats</strong></td>
<td><strong>Alcohol</strong></td>
<td><strong>Quat/Alcohol blends</strong></td>
<td><strong>Ortho-phthaldehyde</strong></td>
</tr>
<tr>
<td><strong>Quats</strong></td>
<td><strong>Alcohol</strong></td>
<td><strong>Quat/Alcohol blends</strong></td>
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</tr>
</tbody>
</table>

### Disinfectants
- **Soaps & Detergents**
- **Quats**
- **Phenols**
- **Quat/Alcohol blends**
- **Aldehydes Glutaraldehyde Formaldehyde Ortho-phthaldehyde**
- **Fewer Resistant bacteria**
- **Hydrogen Peroxide or Bleach Hypochlorite**
- **Peracetic acid or Peracetic acid/hydrogen peroxide blend**
How to a Make Disinfectant Fail!

- Organic debris inactivates many disinfectants:
  - wet or dried: blood, body fluids, tissues, mucus, etc.
- Disinfectant’s
  - concentration too low
  - pH not adjusted to optimal
  - expired: Bleach at use conc. loses effectiveness in 24hrs (hospital-qualified hypochlorite wipes stabilized)
  - insufficient contact with or time on surfaces (EPA label instructions – litigation risk if not followed)
  - use of cellulose (paper or cotton based) rags decrease effectiveness of many different disinfectants

Rags Can Reduce Effectiveness of Disinfectants

- Wipes & rags can contain cellulose (paper, cotton) that bind or absorb active disinfecting molecules of:
  - sodium hypochlorite (NaOCl)
  - Quats (QAC)
  - hydrogen peroxide (H₂O₂)

Examples: Decreases active concentration

- **Shultz**
  - reduced bleach disinfection capability >75% in 30sec if soaked into paper towel

- **Kusumaningruman**
  - NaOCl 500ppm chlorine >100,000 S. aureus killed
  - cotton rag in bucket 1hr
  - only killed 100 S. aureus same contact time
Monitoring Methods: Disinfection

Killed it? Adenosine triphosphate (ATP) bioluminescence test = viable presence

- Swab 10 X 10 cm area
- Snap & Squeeze
- Insert into reader

Adenosine triphosphate (ATP): chemical inside human, bacterial, fungal, yeast cells is expended when living functions occur

Neither viruses nor spores are detected by this method!!
- viruses not “alive”
- spores hibernating so insufficient energy (ATP) expended

(Free Download)

Guideline for Disinfection and Sterilization In Healthcare Facilities, 2008
William A. Rutala, Ph.D., M.P.H.,1,2 David J. Weber, M.D., M.P.H.,1,2 and the Healthcare Infection Control Practices Advisory Committee (HICPAC)

RECOMMENDED PRACTICES
RP Summary:
Recommended Practices for Environmental Cleaning
PURPOSE: To provide guidance for environmental cleaning and disinfection in the perioperative practice setting.

https://www.apic.org
New November 2015 has updated guidelines and checklist together
Free: Download 47 pages

Sections

1. The “New Breeds”: aggressive, antibiotic resistant
2. OR sources of contamination

3. OR sources of reduced patient resistance to infection
Hypothermia at 36°C
Just 1°C Below Normal

Increases patient risk of:

- Need for blood transfusion 40%
- Time spent in ICU 43%
- Post-operative MI 44%
- Need for mechanical ventilation 34%
- Surgical site infection (SSI) 64%

1°C below normal Increases risk of death by: 55%
Much higher risk if trauma patient

Mahoney; Sessler; Wagner

Hypothermia 1°C below normal

- Impairs immune response to bacteria by reducing white blood cell (WBC):
  - activation
  - mobility towards threat (chemotaxis)
  - phagocytosis (capture & taking in bacteria)
  - killing capability
    - slows enzyme activity
    - lowers local oxygen, reducing PMN oxidative burst

- Low tissue oxygen reduces
  - reduces healing quality
  - delays healing (increasing risk of dehiscence & infection)

- Reduced platelet function, increased need transfusion
Particles In Wounds Increase Risk of Infection

1. Function as transport vehicle for microorganisms
2. Immune Distraction: Reduces wound’s ability to resist infection
3. Protects biofilm formation

Before intervention: their standard cotton; some spunbond/polypropylene
- 850 particles/m$^3$
- 25 CFU/m$^3$

Intervention replaced OR staff garments with quality polypropylene
- 50 particles/m$^3$
- 7 CFU/m$^3$

Wound contamination
- dropped 46% during sternal surgery
- dropped 90% during leg surgery

Verkkala 1998 Cardiothoracic Surgery

Lint fibers with bacteria
**Immune Distraction**

**Lint & Particles Commit: Crime of Distraction**

+ Things that strongly attract immune system’s attention, become the focused activity, ignoring tiny bacteria perceived as comparatively minor threat!!

**Significantly Reduced Infection Threshold**

1. Macrophage attention to larger lint & particulate threats
2. Neutrophils deplete oxidative burst defending these larger threats
3. WBCs ignore the few *Pseudomonas* nearby (immune distraction)
4. The few contaminating bacteria become many
5. Infection initiated (threshold reduced—takes fewer bacteria to infect)

**Elek**
+ Wound: no particles = 10 million bacteria ($10^7$) to cause infection
+ Wound: with suture fragment = 100 bacteria ($10^2$) to cause infection

**Jaffray**
+ Wound: no particles = 1,000 ($10^3$) = 1/10 animals infected
+ Wound: 2mg sterile particulates = 1,000 ($10^3$) = 9/10 infected

**Reduced # bacteria needed for infection by 100,000X!**

**Increased number of “patients” infected from 10% to 90%!**
Breast Implant Contractures

- Implant capsular contractures: hard scar tissues walling off threat
- Surgeon certain particles attracted onto implant surface and there
  - distract local immune response & hide bacteria
  - enable few bacteria contaminating site to form a micro-biofilm
  - subclinical infection

(Pajkos AB, 2003; Netscher D, 2004; Mladick RA, 2005; Netscher DT, 2005)

Breast Implants

- He was still convinced in spite of disbelievers
- Performed all breast implant surgeries:
  - lint-free
  - powder-free gloves
  - no touch implant
  - no touch patient skin (even though prepped)

Eight years without a single capsular contraction!

Little things (lint, powder, other particles matter!)
Principle applies to all implants!!

Post-Surgical Complications Associated With Lint & Particulates

- Increased incidence / severity infections
- Blood clots/foreign-body emboli
- Amplified inflammation
- Poor quality wound healing
- Granulomas
- Adhesions & band formation

Where Do Lint & Particles Come From?
Sources of Lint & Particles

- Cotton or paper based Gowns
- Drapes (watch for cellulose (paper) in fenestration)
- Hair bonnets
- Tip cushions
- Surgical towels
- Glove powder
- Sterilization wrap
- Warming blankets
- Instrument tray liners
- Unsealed sponges/gauze
- Back-table covers (esp. Bariatric & Ortho)
- Terry cloth towels for drying in Sterile Processing
- Cardboard fray
- Dried blood, tissue
- Cotton or paper based drapes
- Bone & cement debris
- Mineral deposits on instruments
- Newspapers brought into some ORs!!

White Wipe Swipe: SPD Wrapping Table (6.2013)

90% cellulose fibers
10% polyester (melted edges)
Don’t Be Discouraged!!
Think: I have Power to Improve Patient Outcomes!!

Thank You!!!
You’re the BEST!
Questions?

- Please type in your questions in the chat box in the lower left
  - Be sure to click “Send”

References

APIC Course: Exogenous Factors: Oft Missed Opportunities for Preventing Surgical Site Infections

Speaker: Wava Truscott, PhD, MBA
Webinar 9.21 & 10.20, 2016
References to “Oft Neglected Contributors to SSI” - page 1


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The presence of lint and fibers are micro-foreign bodies that distract the immune system. White blood cells attack these particles, ignoring the few bacteria contaminating the wound. The ignored bacteria multiply virtually undisturbed, rapidly becoming a greater threat, increasing the risk of infection by immune distraction.


References for Hair & Head Cover Slides